(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 304 390 A2**

EUROPEAN PATENT APPLICATION

(12)

(21) Application number: **88710014.7**

(22) Date of filing: **10.06.88**

(51) Int. Cl.[4]: **B 62 D 55/08**
B 62 D 55/12, B 62 D 55/24

(30) Priority: **12.06.87 JP 146357/87**

(43) Date of publication of application:
22.02.89 Bulletin 89/08

(84) Designated Contracting States: **DE FR GB IT**

(71) Applicant: **Bridgestone Corporation**
10-1, Kyobashi 1-Chome Chuo-Ku
Tokyo 104 (JP)

(72) Inventor: **Uchida, Shinji**
827 Kashio-cho Totsuka-ku
Yokohama-shi Kanagawa-ken (JP)

Furuta, Mitsuo
20-22 Higashinakahara 1-chome
Hiratsuka-shi Kanagawa-ken (JP)

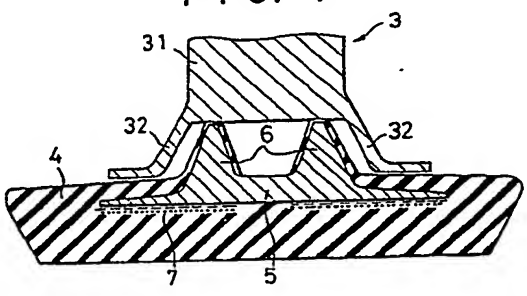
(74) Representative: **Huss, Carl-Hans, Dipl.-Ing.**
Patentanwalt Griesstrasse 3 a Postfach 14 54
D-8100 Garmisch-Partenkirchen (DE)

The title of the invention has been amended (Guidelines for Examination in the EPO, A-III, 7.3).

(54) Traction device with rubber track.

(57) A rubber crawler system cpmprises an endless rubber-made belt-like crawler shoe in which many cores are embedded at the bases thereof perpendicularly to the longitudinal direction of the crawler shoe and parellelly to each other, and rollers rolling on the crawler shoe, each of the cores having provided thereon roller guides protruded inwardly from the inner circumference of the crawler shoe and so formed that the rollers of a vehicle roll on the guide projections to precent the rollers from disengaging from the rollers. The rollers rolling on the crawler shoe are composed each of a cylindrical body which rolls on guide projections and flanges formed on either outer circumferential ends thereof and which roll on the inner circumference of the crawler shoe when they are between the cores in said crawler shoe.

FIG. 4



EP 0 304 390 A2

Description

Rubber Crawler System

BACKGROUND OF THE INVENTION

Field of the Invention:

The present invention relates to a rubber crawler system comprising an endless rubber-made belt-like crawler shoe in which many cores are embedded at the bases thereof perpendicularly to the longitudinal direction of the crawler shoe and parallelly to each other, and rollers rolling on the crawler shoe, each of the cores having provided thereon roller guides protruded inwardly from the inner circumference of the crawler shoe and so formed that the rollers of a vehicle roll on the guide projections to prevent the rollers from disengaging from the rollers.

Description of the Prior Art:

The crawler system comprises an endless rubber-made belt-like crawler shoe 100 which is used as extended over a sprocket 1 and idler tumbler 2 of a vehicle as shown in Fig. 1 and on the inner circumference of which rollers 3 between the sprocket 1 and idler tumbler 2 roll. Also as shown in Fig. 2, many cores 101 have the bases thereof embedded in the crawler shoe 100 perpendicularly to the longitudinal direction of the crawler shoe 100, and have roller guides 102 formed thereon as protruded inwardly from the inner circumference of the crawler show 100. Further, a tensile reinforcing member 103 such as steel cord or the like is embedded in the crawler shoe 100 in such a manner as surrounds the outer circumferences of the cores 101. Wheels 3A in pair composing each roller 3 roll on the inner circumferences of the crawler shoe 100 that are outside the guide projections or roller guides 102, respectively.

The rubber crawler system in which the wheels 3A of the roller 3 roll outside the roller guides 102 is disadvantageous in that as the crawler shoe surface on which the rollers roll are fatigued, the rubber is broken so that finally the cores 101 in the rubber are exposed and corroded by the incoming water. Further, the rusty cores 101 become fragile and broken with the result that the tensile reinforcing member 103 is broken. In the crawler shoe portions on which the wheels 3A of the roller 3 roll, the rubber is damaged as shown in Fig. 3 and water and mud penetrate into the damaged portions indicated with a reference numeral 200. The rolling of the roller wheels 3A causes the damage 200 in only the upper portion of the core 101, not between the cores 101. This is because the thickness of the rubber on the core 101 is smaller than that of the rubber between the cores 101. To prevent the damage 200 from taking place, it suffices to increase the thickness of the rubber on the core 101. However, this countermeasure needs a considerably increased amount of rubber for manufacturing the crawler shoe 100 and is infeasible in practice.

SUMMARY OF THE INVENTION

The present invention has an object to overcome the above-mentioned drawbacks of the conventional rubber crawler system by providing a rubber crawler system of which the crawler shoe portion on the core has an improved rigidity and in which a reduced load is applied to the crawler shoe.

The above object can be accomplished by providing a rubber crawler system comprising, according to the present invention, rollers rolling on the crawler shoe each composed of a cylindrical body which rolls on guide projections and flanges formed on either outer circumferential ends thereof and which roll on the inner circumference of the crawler shoe when they are between the cores in the crawler shoe.

In the rubber crawler system according to the present invention, when the rollers are on the roller guides or guide projections, the cylindrical body thereof rides on the tops of the roller guides so that the weight of a vehicle and the rollers themselves is supported on the roller guides, and when the rollers are off the guides, the inner circumference of the crawler shoe and flanges of the rollers get into contact with one another and the weight of the vehicle and rollers is supported on the crawler portions having the rubber of a large thickness. Therefore, according to the present invention, it is possible to provide a rubber crawler system of which the crawler shoe is not easily damaged at the inner circumference thereof by the rollers but is highly durable.

These and other objects and advantages of the present invention will be better understood from the ensuing descrip tion made by way of example of the embodiments of the present invention with reference to the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic side view showing the general structure of the crawler system;

Fig. 2 is a sectional view showing a conventional rubber crawler system;

Fig. 3 is a sectional view for explanation of the disadvantages of the conventional rubber crawler system;

Fig. 4 is a sectional view showing an preferred embodiment of the present invention;

Fig. 5 is a front view of the roller used in the rubber crawler system of the present invention;

Fig. 6 is a sectional view taken alone the line

III-III in Fig. 5;

Fig. 7 is an explanatory drawing showing the extended length of the roller flange;

Fig. 8 is a sectional view to explain the height from the inner circumference of the crawler shoe to the top of the roller guide;

Figs. 9 to 11 are sectional views taken along the line X-X in Fig. 8 and showing variants of core, respectively;

Fig. 12 is an explanatory drawing explaining how the weight is applied to the crawler when the roller rolls thereon;

Fig. 13 is a sectional view showing another embodiment of the present invention;

Fig. 14 is a sectional view showing a yet another embodiment of the present invention;

Fig. 15 is a plane view from inside the crawler shoe; and

Figs. 16 and 17 are schematic side views of variants of crawler shoe, respectively.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to Fig. 4, the rubber crawler system according to the present invention comprises rollers 3 each consisting of a cylindrical body 31 and a pair of flanges 32 formed on either outer circumferential ends thereof. The rubber crawler system according to the present invention also comprises an endless rubber-made belt-like crawler shoe 4 in which many cores 5 are embedded as in the conventional rubber crawler shoes, the cores 5 each having formed thereon roller guides 6 as protruded inwardly from the inner circumference of the crawler shoe 4. When the roller 3 is on the core 5, the outer circumference of the cylindrical body 31 is in contact with the tops of the roller guides or guide projections 6. In this state, the flanges 32 slightly touch or is somewhat away from the inner circumference of the crawler shoe 4. When the roller 3 disengages from the core 5, the flanges 32 get into contact with the inner circumference of the crawler shoe 4. The roller 3 is detailedly shown in Figs. 5 and 6. Assume that the height from the top of the guide projection 6 of the core 5 to the inner circumference of the crawler shoe 4 is h_2 and the height from the outer circumference of the cylindrical body 31 of the roller 3 to the end of the flange 32 extending outwardly is h_1 (as shown in Figs. 7 and 8). By designing the crawler system so that h_1 is a little larger than h_2, it is possible to reduce the vibration when the vehicle using the crawler system. On the contrary, the height h_1 may be somewhat smaller than the height h_2.

The roller guides or guide projections 6 may be built in a variety of forms, for example, as shown in Figs. 9 to 11. The guide projection 6 shown in Fig. 9 has a circular top for facilitating the cylindrical body 31 of the roller to easily roll thereon. The guide projection 6 shown in Fig. 10 has a flat top. The guide projection 6 shown in Fig. 11 has a top extended longitudinally of the crawler shoe 4, and these guide projections 6 are disposed as staggered on the crawler shoe 4.

Fig. 12 shown the rollers 3 of which the one is on the core 5 and the other lies between the cores 5. The guides 6 of these cores 5 are formed as extended longitudinally of the crawler shoe 4 for the cylindrical body 31 of the roller 3 to roll over a longer distance. If the roller 3 goes off the core 5, the flanges 32 will roll in contact with the inner circumference of the crawler shoe 4. Assure that the base length of the core 5 is w_1 and top length of the guide projection 6 is w_2. It is preferable from the standpoint of durability that w_2 should be longer than w_1.

Fig. 13 shows another embodiment of the present inven tion. A roller 3 in which a flange 32 is formed on only one outer circumferential edge of the cylindrical body 31 is shown in this Figure. In a yet another embodiment of the present invention shown in Fig. 14, the roller 3 has a rib 33 formed near the center of the outer circumference of the cylindrical body 31, and between the flanges 32 in pair, thereof. Recesses are formed between one flange 32 and the rib 33 and between the other flange 32 and the rib 33, respectively, and the guide projections 6 enter the respective recesses.

In an embodiment shown in Fig. 15, the inner circumferences of the crawler shoe 4 where the flanges 32 roll are formed wide transversely of the crawler shoe 4. As seen in Fig. 15, there are formed along the center line of the crawler shoe 4 holes 7 in which teeth 1A of the sprocket 1 shown in Fig. 1 are to be engaged.

In an embodiment shown in Fig. 16, the inner circumferences of the crawler shoe 4 on which the flanges 32 roll are formed as heaped up. Fig. 17 shows an embodiment in which the inner circumferences of the crawler shoe 4 outside the roller guides 6 of the cores 5 are formed as lowered.

Claims

1. A rubber crawler system, comprising an endless rubber-made belt-like crawler shoe in which many cores are embedded at the bases thereof perpendicularly to the longitudinal direction of the crawler shoe and parallelly to each other, and rollers rolling on the crawler shoe, each of the cores having provided thereon roller guides protruded inwardly from the inner circumference of the crawler shoe and so formed that the rollers of a vehicle roll on the guide projections to prevent said rollers from disengaging from the rollers, characterized in that said rollers rolling on said crawler shoe are composed each of a cylindrical body which rolls on guide projections and flanges formed on either outer circumferential ends thereof and which roll on the inner circumference of said crawler shoe when they are between said cores in said crawler shoe.

FIG. 1

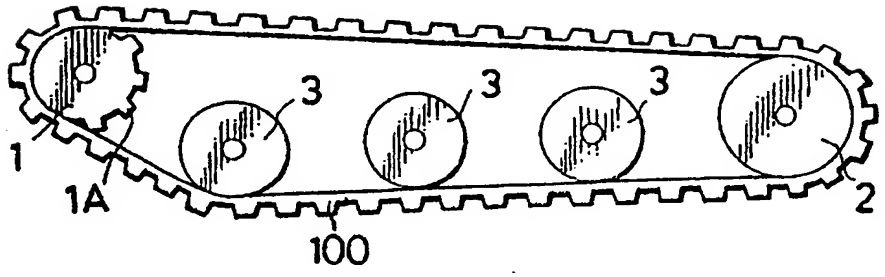


FIG. 2

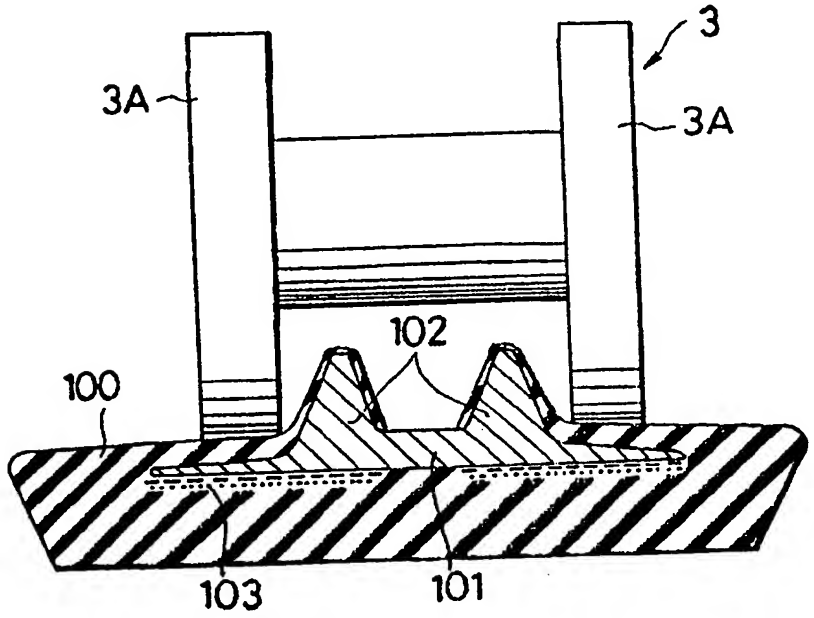


FIG. 3

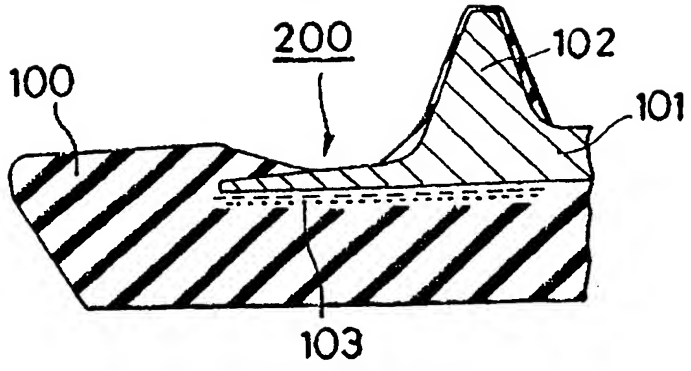


FIG. 4

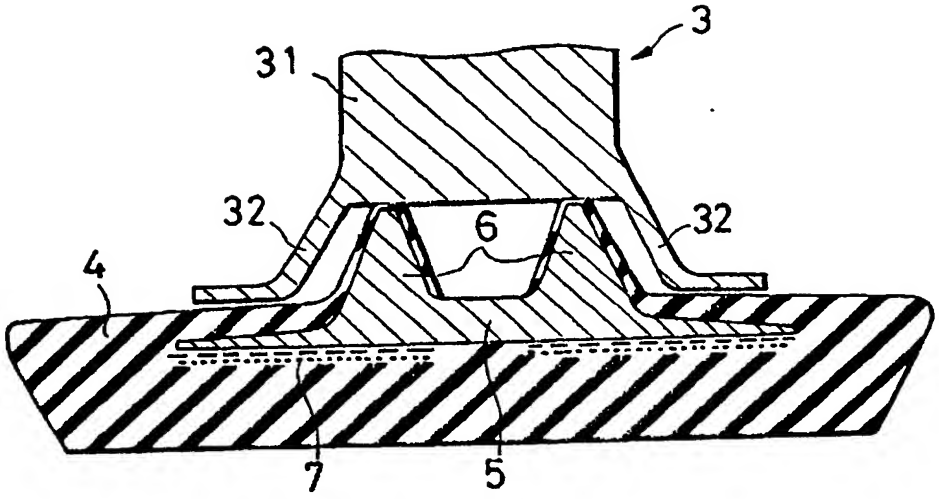


FIG. 5

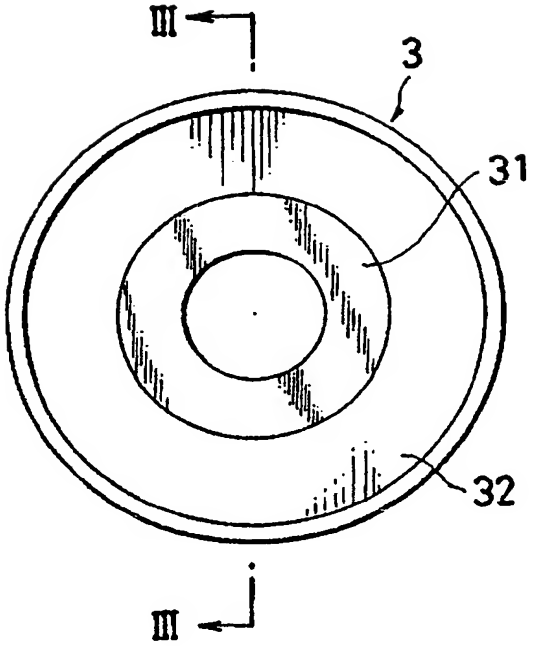


FIG. 6

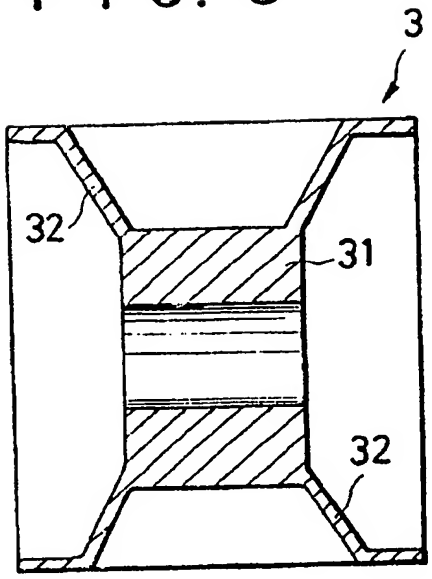


FIG. 7

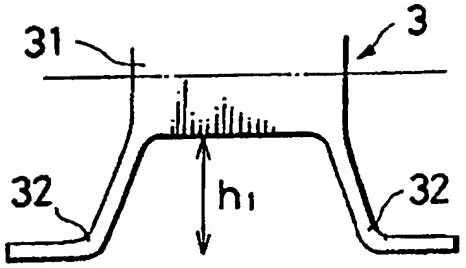


FIG. 8

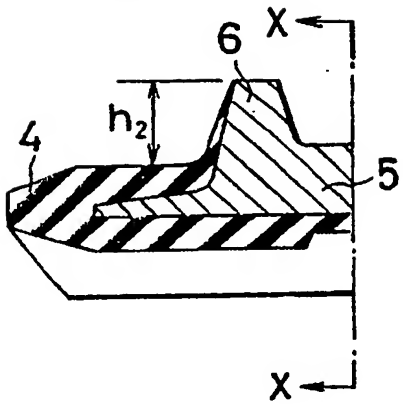


FIG. 9

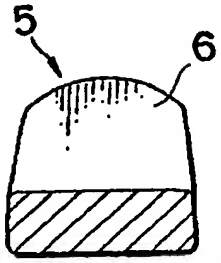


FIG. 10

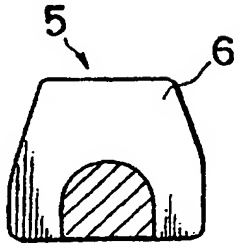


FIG. 11

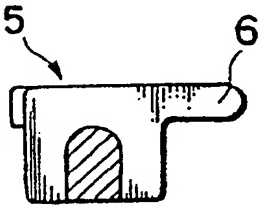


FIG. 12

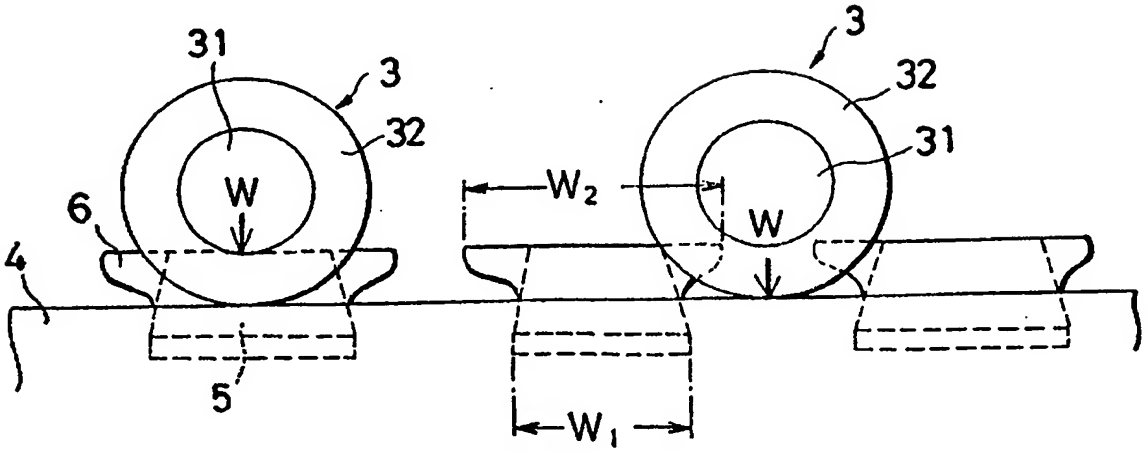


FIG. 13

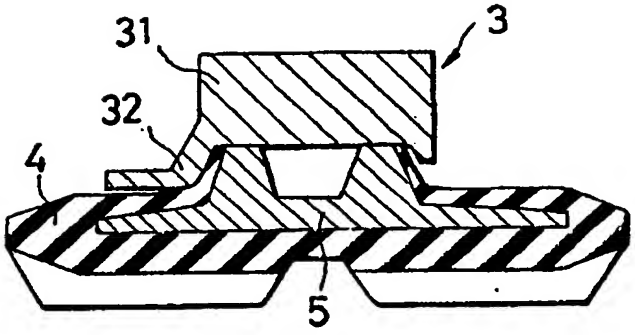


FIG. 14

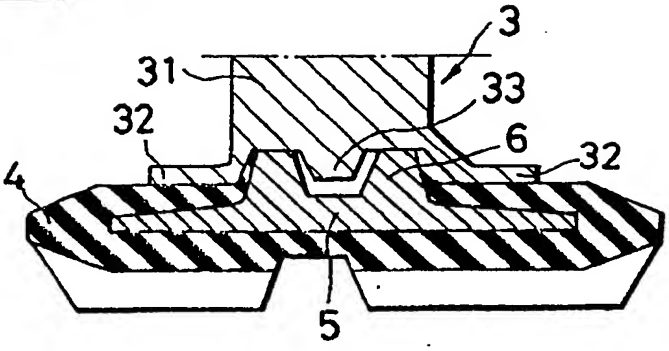


FIG. 15

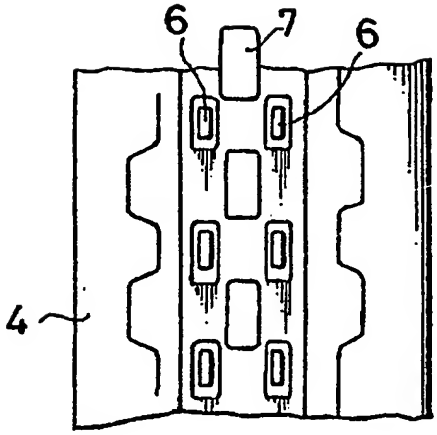


FIG. 16

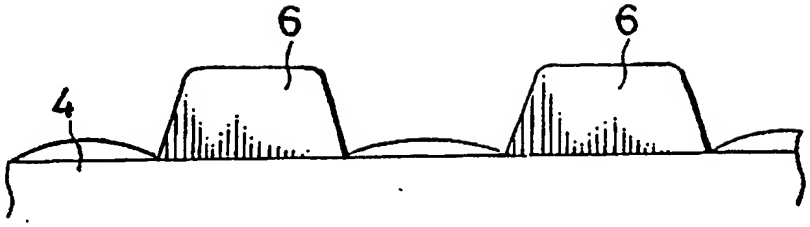
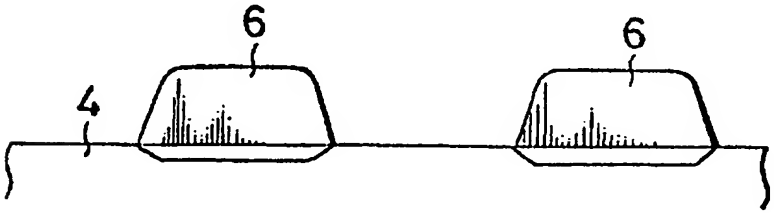


FIG. 17



(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 304 390**
A3

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **88710014.7**

(22) Date of filing: **10.06.88**

(51) Int. Cl.[4]: **B 62 D 55/08**
B 62 D 55/12, B 62 D 55/24,
B 62 D 55/20, B 62 D 55/14

(30) Priority: **12.06.87 JP 146357/87**

(43) Date of publication of application:
22.02.89 Bulletin 89/08

(84) Designated Contracting States: **DE FR GB IT**

(88) Date of deferred publication of search report:
23.11.89 Bulletin 89/47

(71) Applicant: **Bridgestone Corporation**
10-1, Kyobashi 1-Chome Chuo-Ku
Tokyo 104 (JP)

(72) Inventor: **Uchida, Shinji**
827 Kashio-cho Totsuka-ku
Yokohama-shi Kanagawa-ken (JP)

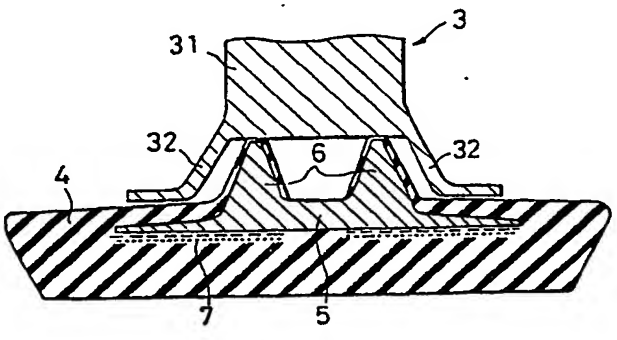
Furuta, Mitsuo
20-22 Higashinakahara 1-chome
Hiratsuka-shi Kanagawa-ken (JP)

(74) Representative: **Huss, Carl-Hans, Dipl.-Ing.**
Patentanwalt Griesstrasse 3 a Postfach 14 54
D-8100 Garmisch-Partenkirchen (DE)

(54) Traction device with rubber track.

(57) A rubber crawler system comprises an endless rubber-made belt-like crawler shoe (4) in which many cores (5) are embedded at the bases thereof perpendicularly to the longitudinal direction of the crawler shoe (4) and parallelly to each other, and rollers (3) rolling on the crawler shoe (4), each of the cores (5) having provided thereon roller guides (6) protruded inwardly from the inner circumference of the crawler shoe (4) and so formed that the rollers (3) of a vehicle roll on the guide projections to prevent the rollers (3) from disengaging from the rollers (3). The rollers (3) rolling on the crawler shoe (4) are composed each of a cylindrical body which rolls on guide projections and flanges formed on either outer circumferential ends thereof and which roll on the inner circumference of the crawler shoe (4) when they are between the cores (5) in said crawler shoe (4).

FIG. 4



EP 0 304 390 A3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 88 71 0014

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
Y	DE-A-3 523 528 (BRIDGESTONE CO. LTD) * Figures 1,4; page 8, paragraph 3 *	1	B 62 D 55/08 B 62 D 55/12 B 62 D 55/24 B 62 D 55/20 B 62 D 55/14
Y	US-A-3 575 474 (P.E. RUSS) * Figures 1,2,6; column 1, line 65 - column 2, line 69 *	1	
A	PATENT ABSTRACTS OF JAPAN, vol. 9, no. 114 (M-380)[1837], 18th May 1985; & JP-A-60 1082 (FUKUYAMA GOMU KOGYO K.K.) 07-01-1985 * Abstract *	1	
A	CH-A- 350 200 (AB WESTERASMASKINER) * Figure 2; page 1, line 55 - page 2, line 7 *	1	
A	DE-C- 466 116 (MASCHINENFABRIK ESSLINGEN) * Figures 1,2; lines 35-45 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 62 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	05-09-1989	CHLOSTA P.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P0401)